

# Designing and Developing a Gamified App for Enhancing Independent Practice in K-12 Music Education

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DOI:10.59668/1269.15625



*Practice is essential for skill acquisition in any domain. Research in music education indicates that time spent practicing and effective strategies are both predictors of the achievement level in musical performance. However, many K-12 music students today lack the motivation and self-regulation skills to practice independently. Using design thinking, the researcher creates LessonLink, a gamified mobile application to motivate and cultivate K-12 music students' self-regulation for independent practice. LessonLink serves multiple roles, including a learning management system, an interactive platform to enhance teacher-student-parent interaction, a gamified platform to motivate student practice, and an embedded self-regulation tool for goal-setting and self-monitoring.*

## Introduction

Many K-12 children receive private music lessons weekly to learn how to play an instrument. In a typical private music lesson, the music teacher instructs and assigns students music to practice during the week. Practice usually takes place at home independently, without the presence of their teachers.

Practice involves playing an instrument repetitively to improve technical skills, musicality, and overall performance (Austin & Berg, 2006). Practice is not only essential in music education; it is a key to skill acquisition in any domain. A music student is typically expected to practice 20 to 30 minutes daily to reinforce the learning they received from their music teachers.

However, independent practice is difficult for many children, especially those who have not yet developed self-regulation skills (Hallam et al., 2012; McPherson & Renwick, 2001). A common problem is that students do not come to their lessons prepared because they did not practice optimally at home, either not devoting enough time to practice or practicing ineffectively (Hallam et al., 2012; Nielsen, 2001).

## Challenges of practice

Effective practice takes time and effort. It is characterized by focused, sustained, and purposeful effort, which we call deliberate practice (Ericsson, 2006). A deliberate practice consists of using practice strategies that directly affect the development of students' musical performance (Sloboda et al., 1996; Jorgensen, 2002). Deliberate practice cannot exist without learners' motivation to become self-regulated learners (Austin & Berg, 2006). Therefore, the challenges of practice can be narrowed down to two categories: a lack of motivation and self-regulation skills.

## Mobile learning application

A possible solution to the lack of motivation and implementation of self-regulation strategies is a tool students can utilize during the week while practicing at home. This tool should boost their motivation to initiate and persist in independent practice. This tool should also guide students to be self-regulated learners, providing them with a platform to exercise self-regulation strategies. A mobile application is selected because mobile technologies are ubiquitous and a popular platform for young children's learning in this digital age (Callahan & Reich, 2021). Mobile apps can provide personalized or customized user experiences (Melhuish & Falloon, 2010), allowing students to interact with instructors and other learners outside of a classroom setting (Almaiah et al., 2020).

An app analysis revealed that there are minimal tools available in the app store for music practice. Most practice tools in the app store are strictly for ear training, sight reading, or for keeping a practice journal where students can log how many times they practice. However, they neither motivate nor provide opportunities for students to implement self-regulation strategies. Therefore, the first author decided to create an app that music students can use during the week while practicing.

## LessonLink

To generate the app's functionality that aligns with users' learning goals, motivation, and values, the first author went through the design thinking process to create LessonLink. Design thinking is a method of understanding problems and producing innovative solutions using a human-centered approach (Valentim et al., 2017). The design thinking process begins with dissatisfaction with the current state of things and an idea of what the end product should look like, which then evolves into a concrete product over time (Razzouk & Shute, 2012).

LessonLink is a gamified mobile learning application. Its two primary goals are:

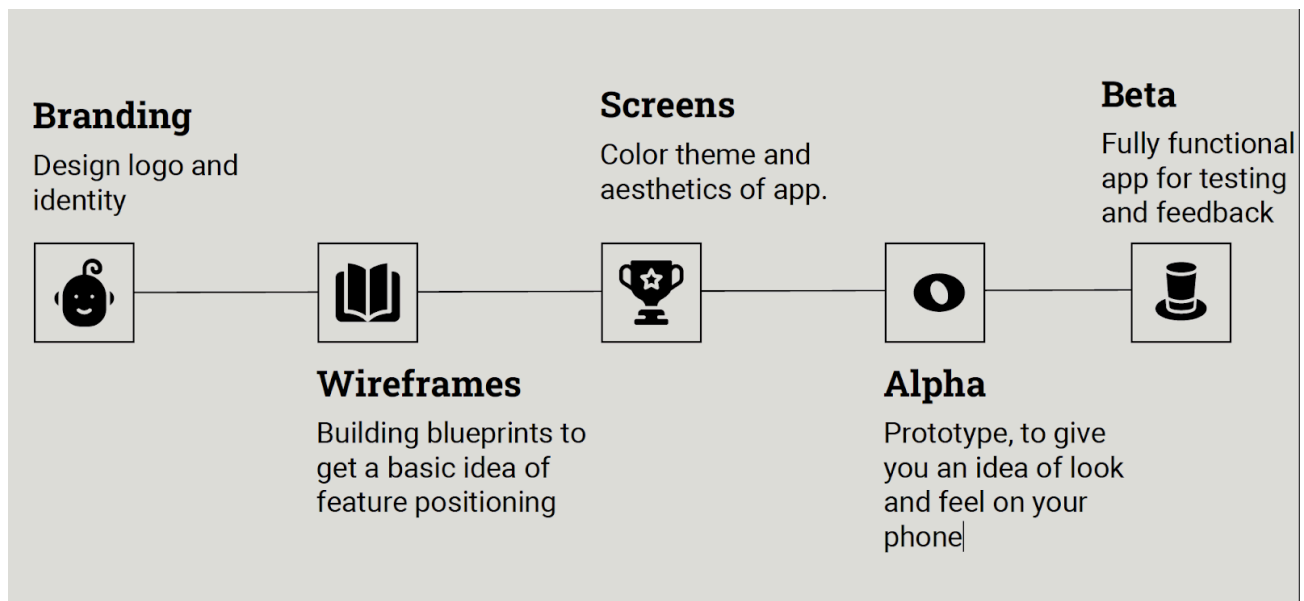
1. To provide a fun and incentivized environment for students to initiate and persist in practice.
2. To provide a platform for students to learn and implement self-regulation strategies.

## Development stages of LessonLink

Figure 1 below illustrates the development stages of LessonLink. LessonLink is currently in the Beta stage. After the Beta stage, LessonLink will be ready to be published on the Apple App Store and Google Play.

**Figure 1**

*LessonLink's Development Stages*



## Features of LessonLink

LessonLink has been designed with the following features to motivate students and support them in implementing self-regulation strategies in music-independent practice.

### Gamification

A brief definition of gamification is using game elements in a non-game situation. Gamification in learning incorporates game elements to mediate students' behavior or attitude, leading to learning outcomes (Landers, 2014). Over time, game elements can help increase the value of the task, shaping students' attitudes toward the task, transforming their situational interest into an intrinsic interest, and motivating them to commit to the task. Besides the increased value of the task, game elements can positively influence students by motivating them to engage in the instructional content with more time on the task. Additional time spent often leads to more learning outcomes (Landers, 2014).

Game elements can also promote students' target behaviors, such as deliberate practice, which students might only be willing to do if they are motivated to do so. Game elements that promote such students' self-regulated efforts will likely produce better learning outcomes.

LessonLink has game elements, including a point system, badges, leaderboards, avatars, and quests for two age groups: elementary students (age 4-12) and adolescents (age 13-18). Each time students perform well in lessons and complete self-set weekly missions, they will be awarded points that make them advance on the quests. Once students reach each level of the quest, they will earn badges and customized rewards from their parents or teachers.

LessonLink allows teachers and parents to customize rewards (i.e. ice cream treat, a choice for their favorite restaurant, or a no-chore coupon) for individual students. These personalized performance-contingent rewards aim to help students increase self-efficacy and motivation (Schunk, 1983) and allow students to have a personalized, relevant experience that is meaningful to them, which is vital for a successful experience in a game-based learning environment (Chang & Kuwata, 2020).

Gamification alone is insufficient to sustain long-term value. To prevent students from focusing only on rewards, the reward system must support learning behavior pursued beyond the game. Landers (2014) stated that the instructional content must already be sound for the gamification to be effective. Therefore, it is necessary to combine gamification with effective instructional content and good pedagogical approaches so students can feel a sense of competence, autonomy, and relatedness while practicing during the week.

## Three interfaces

LessonLink has three interfaces: Teachers, students, and parents. These interfaces allow instant communication with all stakeholders, involving parents in their children's learning process. An analysis by Hallam (2004) strongly pointed out that parents and teachers influence the value that students place on learning an instrument. LessonLink enables parents to identify both the satisfactory aspects of their children's performance and the areas that require improvement. With the teachers' interface, teachers can listen to students' practice and provide feedback during the week. These three interfaces help strengthen students' sense of relatedness.

## Course management

With LessonLink, teachers can create courses, assign homework, provide feedback, and evaluate students' weekly performance by assigning grades.

## Forum/Chat

Throughout the week, students can utilize the chat function in LessonLink to ask questions or seek feedback about their practice from their teachers. The forum serves as a platform for teachers to make important announcements and for parents or students to discuss various topics. For instance, it can be used for a parent to request a lesson time change or to showcase students' successful performances via images or videos.

## Weekly mission

LessonLink encourages teachers and students to conduct weekly task analyses at the end of their lessons. The task analysis allows students to estimate their capability to accomplish the task before setting reasonable, personalized weekly goals or what we call missions in LessonLink. Once the mission is set, the app will set practice schedule reminders, calculate the mission's progress, and reward students when the mission is accomplished. Teachers' weekly grading criteria can provide students with standards and guidelines for the goal. This feature allows students to actively participate in their learning by setting goals and planning their own practice schedule. Without the proper task analysis during the in-person instructions, LessonLink will not achieve the maximum outcome.

## Self-recording

LessonLink enables students to record their practice sessions, keep track of their mission completion, self-monitor, and self-reflect on their practice recordings.

## Conclusion

LessonLink aims to transform theoretical concepts into a realistic way of problem-solving. It demonstrates how a familiar tool can help increase the quantity and quality of independent practice. LessonLink is intended to be a supportive tool for teachers to gamify students' independent practice experiences to influence their behavior and attitudes. Future research on LessonLink should include both quantitative and qualitative data from integrating the app into private music lessons and independent practice.

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